S32
2 AXIS POSITION CONTROLLER
**FEATuRES**

- Two axis
- Operation in manual, in single positioning, in programme modes
- Memory capacity up to 99 programs, each one 33 steps
- Counter [0-9999]
- Easy calibration
- Single point / double point calibration possibility
- Error messages and warning messages
- Retract function
- Two speed positioning and automatic stop offset calculation software
- External START / STOP inputs
- Programs and parameters is stored in memory ten years

**PRINCIPLES OF OPERATION**

The S32 controller is used to position machinery to any desired absolute position with 2 speed reversing drives on the basis of fast / slow / stop.

The controller outputs can be selected to operate:

1. Forward and reverse contactors.
2. Run and reverse, fast and slow for inverter systems.
3. Run and reverse, fast and slow for two speed motors.

Position is monitored by means of an incremental encoder (NPN). The actual position of the axis is displayed at all times. The controller calculates the difference between the actual and demanded position and sets the outputs to give the direction and speed to move the demanded position.

If the distance is greater than the value set in parameter "slow speed distance" the drive will first set off at high speed, as it reaches the distance from the demanded position equal to this parameter, the drive will drop to its low speed. It will now run at the slow speed until it reaches a distance from the demanded position equal to stop offset of the machinery then the drive stops.

The offset value which is due to inertia of the machinery learned by controller automatically.

If positioning does not occur within the limits set in parameter "tolerance", the controller will try to carry if out again and again till the maximum set in "number of trials".

After the last attempt, positioning has not been carried out correctly, "position Ok" contacts will not close indicating something wrong, press stop and check the system.

Providing a speed low enough is used, the overrun will be consistent at all positions, then the stopping accuracy of +/- 0.1 mm can be achieved.

Retract value for the backstop set in the parameters would be used for example on a sheet metal bender, where backstop has to retract (move to a higher count value) whilst the bend is taking place.

**MANUAL SETTING-UP**

To setup the machine and getting correct direction of rotation and correct encoder signals, proceed as follows:

1. Select manual mode
2. Press one of the keys 1, 2, 6, 7 to check the correct direction and fast / slow speed.
   
   If incorrect, change the cabling accordingly.
3. Press forward key (1 or 6), the actual display should count up (in positive quadrant).
   
   If incorrect direction of count is present, interchange A / B cables of encoder.
**DISPLAY and KEYS**

**Y AXIS DISPLAY**
- Actual value is displayed for manual and single modes.
- In auto mode, it shows the value programmed before.

**X AXIS DISPLAY**
- Actual value is displayed for manual and single modes.
- In auto mode, it shows the value programmed before.

**COUNTER DISPLAY**
- It shows number of operations done (counts the count input)
- Press C to clear the count value.

**PROGRAM NO DISPLAY**
- Selected program no (1..99)

**STEP NO DISPLAY**
- Selected step no (1..33)

**SELECTED MODE**
- Leds indicate what mode is selected.
  - (M)anual: Manual positioning
  - (S)ingle: Single positioning
  - (A)uto: Programmed mode

**OK LED**
- Operation is allowed only if OK led lighted.
- E.g. Ok led is lighted off during positioning and operation is not allowed.

### Buttons

- **START**
  - Run / Enter

- **STOP**
  - Stop / Exit

- **M**
  - Mode select

- **P**
  - Program entry

- **C**
  - Display clear / Counter clear

- **DEL**
  - Program or Step delete

- **RETRACT**
  - RETRACT function select

- **CALIBRATION**
  - Only in Manual mode

- **CONFIGURATION**
  - Only in Manual mode

- **Slow Motion**
  - For selected axis

- **Fast Motion**
  - For selected axis

- **Numerical keypad**
WORKING MODES

- MANUAL MODE (Y)
  Y axis selected, related keys used to position Y-axis.

- MANUAL MODE (X)
  X axis selected, related keys used to position X-axis.

- SINGLE MODE
  Y-axis, X-axis and Count values entered, with start positioning takes place.

- AUTO MODE
  Programmed position values can be called and used to position the machinery.

- AUTO MODE (REPEAT)
  Selected program no is repeated continuously.

MANUAL MODE (Y-axis and X-axis)

- M key is pressed to light the led of desired axis and M led.
- Press 1 or 2 for SLOW forward or reverse positioning
- Press 6 or 7 for FAST forward or reverse positioning

SINGLE MODE

- M key is pressed to light the S led for single positioning.
- Press START
- Y-axis display blinks (ready for value entry),
  Press numerical keys for the desired Y position.
- Press START to enter the written value.
- X-axis display blinks (ready for value entry),
  Press numerical keys for the desired X position
- Press START
- # Counter display blinks (ready for value entry),
  Press numerical keys for the desired count.
- Press START to enter the values,

  Positioning is carried out, when the position is found correctly OK contacts close (its led is on).
  In this position, operations are counted, when the count is reached OK contacts open.

COUNT CLEAR

- Press C to clear the counter. (Only in Manual and Single mode)
**AUTO MODE**

Press M to light the Auto led.

0..9

Press numerical keys for the desired program no.

Press START to enter.

Positioning is carried out for step 01 position values. If the position is found correctly, OK contacts close. Operations are counted, when the count is reached OK contacts open, then positioning is carried out for step 02 and it continues as before.

When the recorded steps are finished (max. 33 steps) it returns to step 01 and wait for start.

**AUTO MODE (REPEAT)**

Press M to blink the Auto led.

0..9

Press numerical keys for the desired program no.

Press START to enter.

Positioning is carried out for each step as in the auto mode.

When the recorded steps are finished, it returns step 01 and repeats the program again.

This continuous operation (repeating the program) is exited by pressing STOP.

**PROGRAM VISUALIZATION**

Press M to light the auto led.

0..9

Press numerical keys for the desired program no.

Press P.

Step 01 position and count values are displayed.

With each press P, steps are visualized one after the other.

Press STOP to exit.

**RETRACT FUNCTION**

Backstop has to retract (set retract value in parameters) whilst the bend is taking place to bring to safe position.

Press RETR key to light its led.

Press RETR key to cancel to retract function.

**NOT:** Retract Function

When retract input is closed, after retract delay (Pr.21), backstop is retracted for retract distance (Pr.22).

By count input closing, positioning to original position takes place.

Pr.21: Retract delay
Pr.22: Retract distance
Press M to light Manual led
Press and keep pressing P for 5 sec. Read "total progs" on the display.
First empty program
Number of recorded programs
To delete the selected program.

Press numerical keys for the desired program no.
Press START

Press STOP to exit
Press DEL to delete the displayed step and remaining steps.

Press numerical keys for the desired step no.
Press START

Y display blinks (ready for entry)
Press numerical keys for the new Y-value.
Press START

X display blinks (ready for entry)
Press numerical keys for the new X-value.
Press START

Count display blinks (read for entry)
Press numerical keys for the new count value.
(If count value is 0, counter is ignored.)
Press START
PROGRAM ENTRY

Press M to light manual led

Press P for 5 sec, read "total progs" on the display.

Display shows the first empty program.

Press START

Display shows Step 01

Press START

Y display blinks (ready for entry)

Press numerical keys for the new Y-value.

Press START

X display blinks (ready for entry)

Press numerical keys for the new X-value.

Press START

Count display blinks (read for entry)

Press numerical keys for the new count value.

(If count value is 0, counter is ignored.)

Press START

Press STOP two times for exit

next step

PROGRAM ERASE

Press M to light manual led

Press P for 5 sec, read "total progs" on the display.

Display shows the first empty program.

Press numerical keys for the program no to be erased.

Press DEL

Press START

Press STOP to Exit.

During the programming:

1. If a new program is written over an old program, to erase the displayed step and the remaining steps, press DEL and then press START.
2. Erasing ALL programs: Press and keep pressing DEL, and energy is applied, release DEL.
   After 15 sec, all programs are erased.
**SINGLE POINT CALIBRATION (CORRECT POSITION)**

1. Press **M** to light Manual led and the desired axis led.
2. Press **CAL (5)** for 10 sec. Read \( \text{CAL } \) on the display.
3. Press **PASS**
4. Press numerical keys for the password. (Supervisor Password = 1974)
5. Press **START**
6. Press **Y**
7. Press numerical keys for new value of the selected axis.
8. Press **START**. New value is read on the display.

**DOUBLE POINT CALIBRATION**

1. Press **M** to light Manual led and the desired axis led.
3. Read \( \text{CAL } -2 \) on the display.
4. Press **PASS**
5. Press numerical keys for the password. (Supervisor Password = 1974)
6. Press **START**. Read \( \text{POS } -1 \) on the display.
7. Press **START**. Bring the position minimum, manually.
8. Press **START**
9. Press numerical keys for the measured value entry.
10. Press **START**
11. Press **START**. Read \( \text{POS } -2 \) on the display.
12. Press **START**. Bring the position maximum, manually.
13. Press **START**
14. Press **START**. Bring the position maximum, manually.
15. Press **START**.
PARAMETERS

Press M to light Manual led.

Press CONF (0) for 10 sec. Read "Config" on the display.

Press numerical keys for the password. (Supervisor Password = 1974)

Press START.

Press numerical keys for new value of the selected parameter.

Press START.

Press STOP to exit.

PARAMETER TABLE

<table>
<thead>
<tr>
<th>Pr.No</th>
<th>Fact.default</th>
<th>Pr.No</th>
<th>Fact.default</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLOW SPEED DISTANCE (mm)</td>
<td>01 11  0.50 / 30.0</td>
<td>RETRACT DELAY (0.01 sn)</td>
<td>21 0.20</td>
</tr>
<tr>
<td>PITCH (mm/tour)</td>
<td>02 12  0.16 / 10.00</td>
<td>RETRACT DISTANCE (mm)</td>
<td>22 5.0</td>
</tr>
<tr>
<td>ENCODER (pulse / tour)</td>
<td>03 13  100 / 100</td>
<td>(Reserved)</td>
<td>23 0</td>
</tr>
<tr>
<td>DECIMAL POINT = 0.5</td>
<td>04 14  2 / 1</td>
<td>PASSW (4 digit) S.Pass = 1974</td>
<td>24 1971</td>
</tr>
<tr>
<td>TOLERANCE (mm)</td>
<td>05 15  0.02 / 0.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Reserved)</td>
<td>06 16  1 / 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOL. WINDOW BLANKING (No=0, Yes=1)</td>
<td>07 17  1 / 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MINIMUM SET (mm)</td>
<td>08 18  1.00 / 10.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAXIMUM SET (mm)</td>
<td>09 19  100.00 / 750.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NUMBER of TRIALS</td>
<td>10 20  10 / 10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

EX-FACTORY PARAMETERS LOAD

1 keep pressing "1" and switch on the supply, read Conf,i9 Fact on the display.
TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>24VAC (+/-10%)</td>
</tr>
<tr>
<td>Position sensor</td>
<td>Encoder (A,B ch.), 12VDC / PNP, 10 kHz</td>
</tr>
<tr>
<td>Inputs</td>
<td>6 Digital inputs, 12 VDC/PNP</td>
</tr>
<tr>
<td>Outputs</td>
<td>7 Relay outputs, 3A, NO</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0...50°C</td>
</tr>
<tr>
<td>Front Dimensions</td>
<td>W x H = 192 mm x 96 mm</td>
</tr>
<tr>
<td>Depth (excl. terminals)</td>
<td>D = 86 mm</td>
</tr>
<tr>
<td>Panel cut-out</td>
<td>W x H = 188 mm x 92 mm</td>
</tr>
</tbody>
</table>

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Model: S32 - 2 Axis Position Controller

<table>
<thead>
<tr>
<th>No</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PE</td>
</tr>
<tr>
<td>2</td>
<td>L</td>
</tr>
<tr>
<td>3</td>
<td>N</td>
</tr>
<tr>
<td>4</td>
<td>COM (+)</td>
</tr>
<tr>
<td>5</td>
<td>ENABLE [1]</td>
</tr>
<tr>
<td>6</td>
<td>START</td>
</tr>
<tr>
<td>7</td>
<td>STOP [2]</td>
</tr>
<tr>
<td>8</td>
<td>COUNT</td>
</tr>
<tr>
<td>9</td>
<td>RETRACT</td>
</tr>
<tr>
<td>10</td>
<td>RESET</td>
</tr>
<tr>
<td>11</td>
<td>OK</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

NOT

[1] ENABLE must be shorted to common to enable the positioning.

[2] STOP must be shorted to common to enable the positioning. (NK)
### ERROR MESSAGES

<table>
<thead>
<tr>
<th>ERROR MESSAGE</th>
<th>DESCRIPTION</th>
<th>TO DO</th>
</tr>
</thead>
<tbody>
<tr>
<td>FALRL 0013</td>
<td>Hardware Error (Y Axis)</td>
<td>Apply to manufacturer</td>
</tr>
<tr>
<td>FALRL 0012</td>
<td>Hardware Error (X Axis)</td>
<td>Apply to manufacturer</td>
</tr>
<tr>
<td>Error 0003</td>
<td>Out of limits (parameters 8, 9, 18, 19)</td>
<td>Check the given set values</td>
</tr>
<tr>
<td>Error 0004</td>
<td>No change on the display during calibration</td>
<td>Check encoder connections and mechanism</td>
</tr>
<tr>
<td>Error 0005</td>
<td>Incorrect direction of count during calibration</td>
<td>Check encoder connections and change ch.A / B</td>
</tr>
<tr>
<td>Error 0006</td>
<td>Position is not found</td>
<td>Check and again try</td>
</tr>
</tbody>
</table>

### INSTALLING

**Attention !**:

To ensure a perfect function of the S32 the following installation guide-lines must be strictly observed and followed. Otherwise the guarantee expires and Karaçım takes no liability and guarantee for malfunctions or damages e.g. by incorrect installed wires or other external sources of error or interference, which are exactly explained below.

To guarantee a perfect operation of the S32, the following (external) measures have to be taken additionally:

**PLACE OF INSTALLATION**

Don't install the controller near to sources of interference generating strong inductive or capacitive interferences or strong electrostatic fields.
Install the external power supply directly beside the controller to avoid long low voltage wires.

**POWER SUPPLY**

Use a galvanic separation over an additional transformer.

**WIRE INSTALLATION**

Install all wires for low voltage and encoders always separately from power wires.
Avoid to install these wires close to any contactor or contactor wires.

**SHIELDING**

All external signal wires have to be installed shielded:
1. Rotary encoder wires
2. Wires for all other input signals
3. Wires for all output signals
4. Wires from the power supply to the S32

All shields have to be connected centrally low ohm to PE (Earth potential), connect only one-sided at the S32.

**IMPORTANT !**

1. Don't connect the S32 GND tp PE
2. Don't connect the shielding on both sides to PE
3. If the protective ground potential is heavily "contaminated" by interference voltages, try to connect the shielding to the GND potential instead of PE.

**FAULT CLEARANCE**

If there occurs interferences in spite of applying all above mentioned measures proceed as follows:
1. Add RC elements over contactor coils of AC contactors (for example 0,1 uF/100ohm)
2. Add recovery diodes over DC inductances
3. Add RC elements over each engine phase (in connector box of the engine)
4. Install a power filter before the external power supply